

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number  
**WO 2004/035460 A1**

(51) International Patent Classification:  
B01F 3/04

B67D 1/08,

Edgar, Ivo, Maria [NL/NL]; 11, Waterval, NL-1721 DX  
Broek Op Langedijk (NL).

(21) International Application Number:  
PCT/NL2003/000707

(74) Agent: VERMEULEN, M.; Exter Polak & Charlois  
B.V., P.O. Box 3241, NL-2280 GE Rijswijk (NL).

(22) International Filing Date: 20 October 2003 (20.10.2003)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,  
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,  
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:  
1021699 18 October 2002 (18.10.2002) NL

(71) Applicant (*for all designated States except US*): AIR-  
SPRAY N.V. [NL/NL]; 9, Ivoorstraat, NL-1812 RE  
Alkmaar (NL).

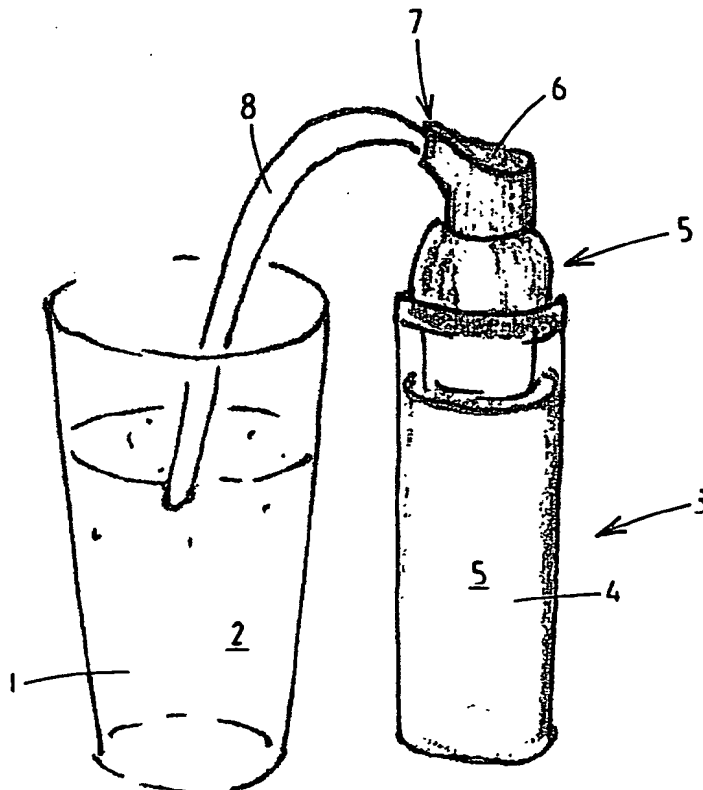
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): VAN DER HEIJDEN,

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR FORMING A FOAM-HEAD ON A BEVERAGE



(57) Abstract: A method for preparing a beverage which is suitable for human consumption, comprising the steps of: filling a glass or the like with a base liquid which is suitable for human consumption, and using a foam-dispensing foam-dispensing device has a foam liquid which is suitable assembly having an air pump device to form a foam, which reservoir containing a stock of for human consumption and a pump and a liquid pump, as well as from a dispensing opening of glass which has been filled foam-forming means for forming foam using the pumped air and foam liquid, and supplying the foam dispensed the foam-dispensing device to the with base liquid, so that the foam forms a head on top of the base liquid.



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

## METHOD AND DEVICE FOR FORMING A FOAM-HEAD ON A BEVERAGE

The present invention relates to the preparation of a beverage which is suitable for human consumption in a glass, cup or the like, in which there is a head on the beverage.

It is known from US 2,977,231 to prepare a beverage with the aid of an aerosol can which is filled with a syrup solution. In this case, the syrup solution is sprayed as a high-velocity jet into a glass filled with a base liquid, for example water or milk. As a result, the base liquid acquires the colour and flavour of the syrup. In this method, some bubbles are formed, so that a thin layer of foam is formed on the surface of the base liquid.

The known method is not suitable for forming a beverage with a real head.

Another drawback of the known method is the use of an aerosol can. Aerosol cans are expensive and are not environmentally friendly.

Another drawback of the known method is that the aerosol can cannot readily be given to children to allow them to prepare their own beverage, since there is a high risk of them making a mess.

It is an object of the invention to propose alternatives which allow a beverage with a head to be prepared.

In particular, it is an object of the invention to propose alternatives which allow children to prepare a (non-alcoholic) beverage with a head themselves.

It is a further object of the invention to provide foam-dispensing devices which make it easy for the user, in particular a child, to produce a beverage with a head.

A first aspect of the invention relates to a method for preparing a beverage which is suitable for human consumption, comprising the steps of:

- filling a glass or the like with a base liquid which is suitable for human consumption, and
- using a foam-dispensing device to form a foam, which foam-dispensing device has at least one reservoir containing a stock of foam liquid which is suitable for human consumption and a pump assembly having an air pump and a liquid pump, as well as foam-forming means for forming foam using the pumped air and foam liquid, and
- supplying the foam dispensed from a dispensing opening of the foam-dispensing device to the glass which has been filled with base liquid, so that the foam forms a head on top of the base liquid.

It should be noted that in the present context the term foam liquid means that this liquid is formed into a foam with air. In practice, the foam liquid will contain one or more ingredients which promote the formation of a foam.

Unlike in the prior art, the method according to claim 1 does not use an aerosol can, but rather uses a foam-dispensing device with an air pump, liquid pump and foam-forming means. Foam-dispensing devices of this type are already marketed, for example by the Applicants, in a design which is easy to handle and can be actuated using a push-button.

The pump assembly of the foam-dispensing devices can preferably be releasably coupled to the reservoir, so that the reservoir can be refilled or an empty reservoir can be replaced.

In particular, foam-dispensing devices of this type are easy for children to actuate.

The flow of foam coming out of the foam-dispensing device is at a relatively low velocity, certainly compared to the jet which emerges from an aerosol can, which safely allows children to

prepare their own beverages. Furthermore, only one portion of foam is dispensed each time the pump assembly is actuated, making metering easier than with an aerosol can, certainly for children.

5

In an advantageous embodiment of the method, the dispensing opening is held below the level of the base liquid, so that the foam rises in the base liquid and forms the head on top of the latter.

10

The foam liquid preferably contains colourings and/or flavourings. If the dispensing of foam in this case takes place below the level of the base liquid, the base liquid will (partially) acquire the colour and/or flavour of the foam rising in the base liquid. Surprisingly, it has been found that the rising foam leads to excellent mixing of colourings and flavourings with the base liquid, so that there is no need to stir the base liquid - which could have an adverse effect on the head.

20

The foam liquid preferably contains an excess of colourings and/or flavourings compared to the quantity which is required to impart colour and/or flavour to the foam which is formed. The excess of these/this substance(s) promotes the formation of colour and/or flavour in the base liquid.

25

In an advantageous embodiment, the foam liquid contains a syrup, for example a fruit syrup. A syrup of this type can easily be used to prepare a beverage with a head which is suitable for children.

30

The invention also relates to the use of a, preferably hand-held, foam-dispensing device comprising a reservoir for a liquid and a pump assembly having an air pump and a liquid pump, as well as foam-forming means for forming foam using the pumped air and liquid, for the purpose of preparing a beverage which is suitable for human consumption in a glass or the like, the beverage having a head.

35

The invention also relates to foam-dispensing devices which are particularly suitable for carrying out the method according to the invention.

5

The invention will be explained in more detail below with reference to the drawing, in which:

Figure 1 shows the preparation of a (children's) beverage in accordance with a first embodiment of the invention,

10

Figure 2 shows the preparation of a (children's) beverage in accordance with a second embodiment of the invention,

Figure 3 shows the preparation of a (children's) beverage in accordance with a third embodiment of the invention,

15

Figures 4a-d show the preparation of a (children's) beverage in accordance with a fourth embodiment of the invention, and

20

Figure 5 shows the preparation of a (children's) beverage in accordance with a fifth embodiment of the invention.

Figure 1 shows a glass 1 which has been filled with a base liquid 2, in this example water. A user, for example a child, can use a foam-dispensing device 3, which is to be explained in more detail below, to convert the water 2 into lemonade and also to form a head on top of the lemonade.

25

The foam-dispensing device 3 is of the hand-held type and has a reservoir 4 which holds a stock of foam liquid which is suitable for human consumption. In this example, the foam liquid contains colourings and/or flavourings in amounts such that a proportion of these colourings and/or flavourings can change the colour and/or flavour of the base liquid. By way of example, the foam liquid contains (fruit) syrup.

30

35

The device 3 has a pump assembly 5 with an air pump and a liquid pump, as well as foam-forming means for forming a foam using the pumped air and foam liquid. A pump assembly 5 of this type is generally known and can in an advantageous embodiment be secured  
5 as an integral unit to a neck of the reservoir 4, for example releasably. In the latter embodiment, the reservoir 4 can be topped up or exchanged.

The device 3 has a push-button 6 which can be moved up and down  
10 and simultaneously actuates the air pump and the liquid pump. In the process, the air pump sucks in ambient air and the liquid pump extracts foam liquid from the reservoir 4. A foam-dispensing passage with an outlet opening 7 is located in the push-button 6.

15 In this case, a flexible dispensing line 8 is connected, preferably releasably, to the outlet opening 7.

To convert the water 2 in the glass 1 into lemonade and at the  
20 same time to form a head, the user introduces the dispensing line 8 into the water 2 and actuates the push-button 6. In this way, foam is formed and enters the glass 1 below the level of the water 2. The foam rises upwards and in doing so changes the colour and/or flavour of the water 2, so that the water 2  
25 becomes lemonade. Furthermore, the foam forms a head on the water, the head being of the same colour and flavour as the lemonade. In order in practice to enable the dispensing opening of the dispensing line 8 to project into the base liquid, it is preferable for the length of the, preferably flexible,  
30 dispensing line 8 to be at least 5 centimetres.

The embodiment shown in Figure 2 largely corresponds to that shown in Figure 1, and therefore corresponding parts are denoted by the same reference numerals.

35 What is different is the design of the dispensing line, which in Figure 2 is designed as a drinking straw 10, so that after the beverage has been prepared the dispensing line 10 can be

detached and can be used as a drinking straw 10. The straw 10 comprises two rigid line parts 10a, 10b which are connected by a flexible part 10c.

- 5 As a result, the user can remove the straw 10 after the beverage has been prepared and can use it to consume the beverage. By way of example, there is provision for the dispensing device 3 (or the associated reservoir) and a plurality of drinking straws 10 to be supplied to the consumer in a pack.

10

Figure 3 once again shows the foam-dispensing device 3, now provided with a flexible dispensing line 11 which can be wound around the reservoir 4 in one or more loops, for example helically.

15

Figures 4a-d once again show the foam-dispensing device 3, and in this case a dispensing line 12 with a concertina construction is provided, so that the dispensing line 12 is flexible and the length of the dispensing line 12 can be varied. The line 12 has  
20 a dispensing nozzle 13 which can be coupled to the push-button in the retracted state of the line 12.

As shown in Figures 4c and 4d, this device 3 with a concertina line 12 can be used to dispense the foam into the base liquid  
25 (Figure 4c) or to dispense the foam onto the top of the base liquid (Figure 4d).

To promote the dispersion of the foam, it is possible for the dispensing nozzle to include a plurality of dispensing openings.

30

Figure 5 shows a foam-dispensing device 20 with a reservoir 21 in carton form for foam liquid, for example having a wall comprising cardboard, as is known for beverages, and having a pump assembly 22. A dispensing mouth 24 which is integral with  
35 the push-button 23 of the pump assembly 22 for dispensing the foam is directed downwards on one side of the reservoir 21, in such a manner that the glass 1 can be placed next to the reservoir 21 and the foam can flow into the glass from above.



In an embodiment which is not shown, the foam-dispensing device has a reservoir of variable volume which decreases when foam liquid is extracted from the reservoir. By way of example, the  
5 reservoir is a pouch or a reservoir with a moveable plunger.

The foam liquid may take a wide variety of forms, provided that it is suitable for human consumption. By way of example, the foam liquid contains a surfactant and/or a foam-stabilizing  
10 ingredient.

In another embodiment which is not shown, the foam-dispensing device is designed with a plurality of reservoirs which hold different foam liquids which can be dispensed separately or  
15 simultaneously, depending on the design of the device.

## CLAIMS

1. Method for preparing a beverage which is suitable for human consumption, comprising the steps of:
  - 5 - filling a glass or the like with a base liquid which is suitable for human consumption, and
  - using a foam-dispensing device to form a foam, which foam-dispensing device has a reservoir containing a stock of foam liquid which is suitable for human consumption and a pump  
10 assembly having an air pump and a liquid pump, as well as foam-forming means for forming foam using the pumped air and foam liquid, and
  - supplying the foam dispensed from a dispensing opening of the foam-dispensing device to the glass which has been filled  
15 with base liquid, so that the foam forms a head on top of the base liquid.
2. Method according to claim 1, in which the foam-dispensing device is held with its dispensing opening below the level of  
20 the base liquid, so that the foam rises in the base liquid and forms a head on top of the latter.
3. Method according to claim 1 or 2, in which the foam liquid contains colourings and/or flavourings in an amount which is  
25 such that a proportion of the colourings and/or flavourings change the colour and/or flavour of the base liquid.
4. Method according to claim 3, in which the foam liquid contains syrup, for example fruit syrup.  
30
5. Method according to claim 2, in which the foam-dispensing device is provided with a, preferably flexible, dispensing line which at one end is connected to the pump assembly and at the other end forms the dispensing opening for the foam, so that the  
35 user can hold the dispensing opening below the level of the base liquid.

6. Method according to claim 5, in which the dispensing line is of removable design.

7. Method according to claim 6, in which the dispensing line is designed as a drinking straw, so that after the beverage has been prepared, the dispensing line can be detached and used as a drinking straw.

8. Method according to one of claims 5-7, in which the flexible dispensing line comprises two rigid line parts which are connected by a flexible part.

9. Method according to one of claims 5-7, in which the dispensing line has a concertina-like construction, so that the dispensing line is flexible and the length of the dispensing line can be varied.

10. Method according to one of claims 5-9, in which a dispensing nozzle is located at the free end of the dispensing line.

11. Method according to claim 10, in which the dispensing nozzle has a plurality of dispensing openings for the foam.

12. Method according to one or more of the preceding claims, in which the pump assembly comprises a common manual actuation member, preferably a push-button, for manual actuation of the air pump and the liquid pump.

13. Method according to one or more of the preceding claims, in which a dispensing mouth formed on the pump assembly is directed downwards on one side of the reservoir, in such a manner that the glass can be placed next to the reservoir and the foam can flow into the glass from above.

35

14. Method according to one or more of the preceding claims, in which the reservoir is a cardboard container, for example in carton form.

15. Use of a foam-dispensing device comprising a reservoir for a foam liquid which is suitable for human consumption and a pump assembly having an air pump and a liquid pump, as well as  
5 foam-forming means for forming foam using the pumped air and foam liquid, for preparing a beverage which is suitable for human consumption in a glass or the like, the beverage having a head.
- 10 16. Foam-dispensing device comprising a reservoir for a foam liquid and a pump assembly having an air pump and a liquid pump, as well as foam-forming means for forming a foam using the pumped air and foam liquid, the reservoir being filled with a  
15 foam liquid which is suitable for human consumption, in such a manner that, as a result of foam being dispensed into a glass filled with a base liquid, a head is formed, the dispensing opening for the foam preferably being located below the level of the base liquid which has previously been introduced into the  
20 glass, so that foam rises and the base liquid gains flavour and colour from the foam, and the head is formed.
17. Foam-dispensing device according to claim 16, in which a, preferably flexible, dispensing line is provided, which at one end is or can be connected to the pump assembly and at the other  
25 end forms the dispensing opening for the foam, so that the user can hold the dispensing opening below the level of the base liquid.
18. Foam-dispensing device according to claim 17, in which the  
30 length of the dispensing line is at least 5 centimetres.
19. Foam-dispensing device according to claim 17 or 18, in which the dispensing line is designed as a drinking straw, so that after the beverage has been prepared the dispensing line  
35 can be detached and used as a drinking straw.

20. Foam-dispensing device according to one or more of claims 17-29, in which the dispensing line comprises two rigid line parts which are connected by a flexible part.
- 5 21. Foam-dispensing device according to one or more of claims 17-20, in which the dispensing line has a concertina construction, so that the dispensing line is flexible and the length of the dispensing line can be varied.
- 10 22. Foam-dispensing device according to one or more of claims 17-21, in which a dispensing nozzle is located at the free end of the dispensing line.
- 15 23. Foam-dispensing device according to claim 22, in which the dispensing nozzle forms a plurality of dispensing openings for the foam.
- 20 24. Foam-dispensing device according to one or more of claims 16-23, in which the pump assembly comprises a common manual actuation member, preferably a push-button, for manual actuation of the air pump and the liquid pump.
- 25 25. Foam-dispensing device according to one or more of the preceding claims 17-24, provided with a flexible dispensing line which can be wound around the reservoir in one or more loops, preferably over a helical path.
- 30 26. Foam-dispensing device according to one or more of the preceding claims 17-25, in which the foam liquid contains a surfactant.
- 35 27. Foam-dispensing device according to one or more of the preceding claims 16-26, in which the foam liquid contains a foam-stabilizing ingredient.
28. Pack comprising a foam-dispensing device which is filled with a foam liquid which is suitable for human consumption and

has a plurality of, preferably more than five, dispensing lines which are suitable for use as drinking straws.

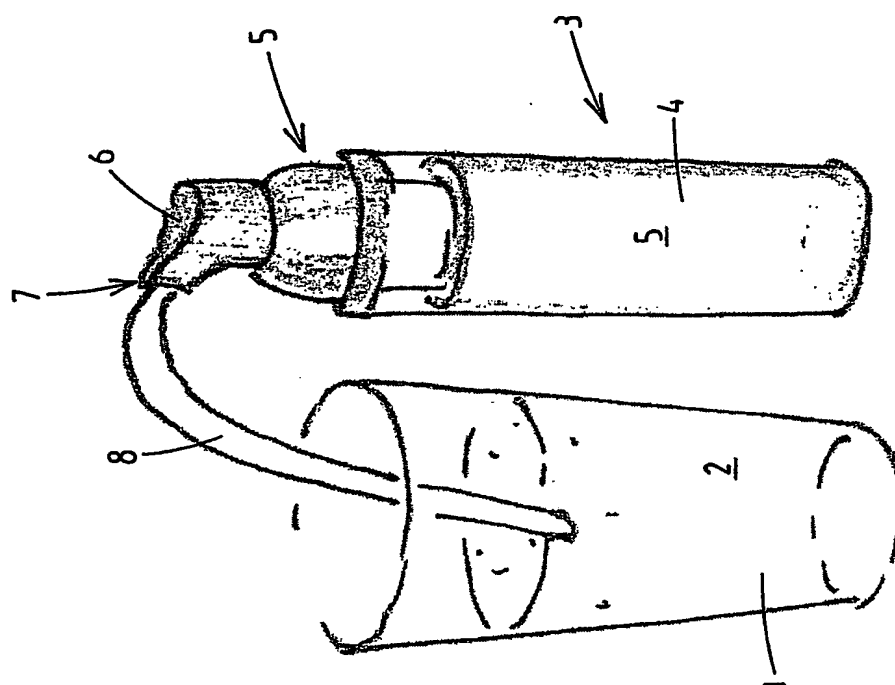


Fig. 1

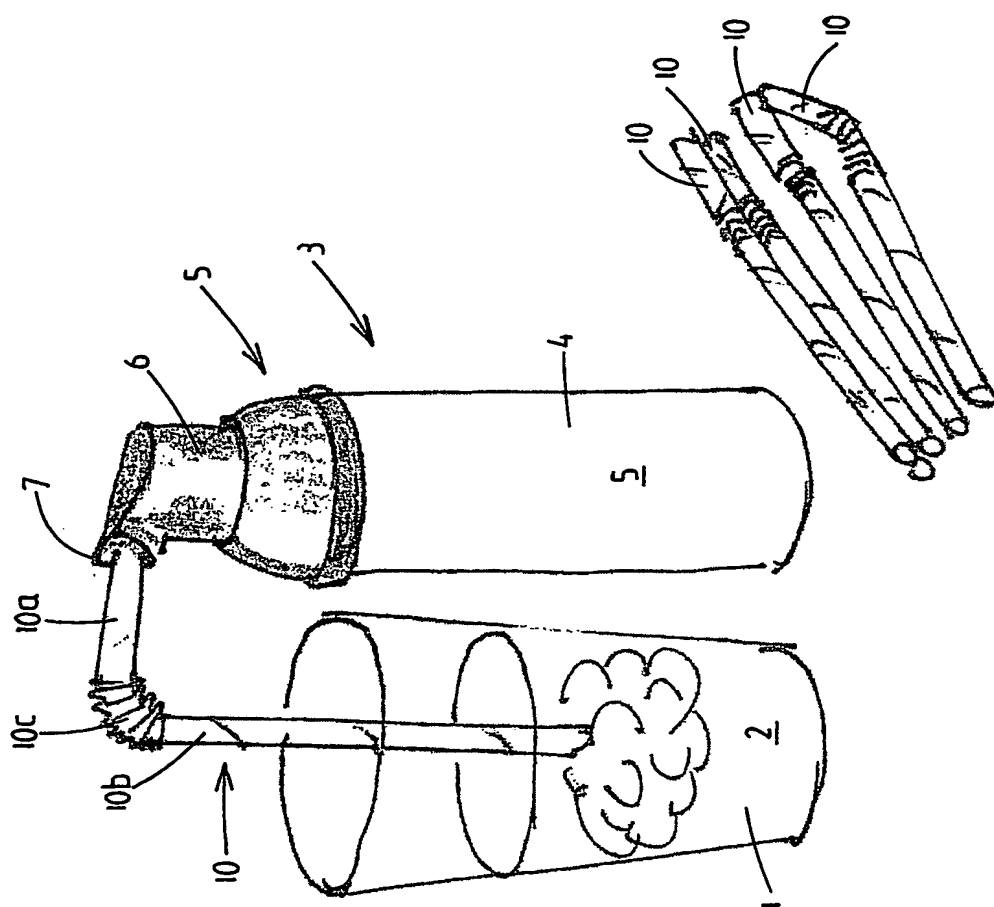


Fig. 2



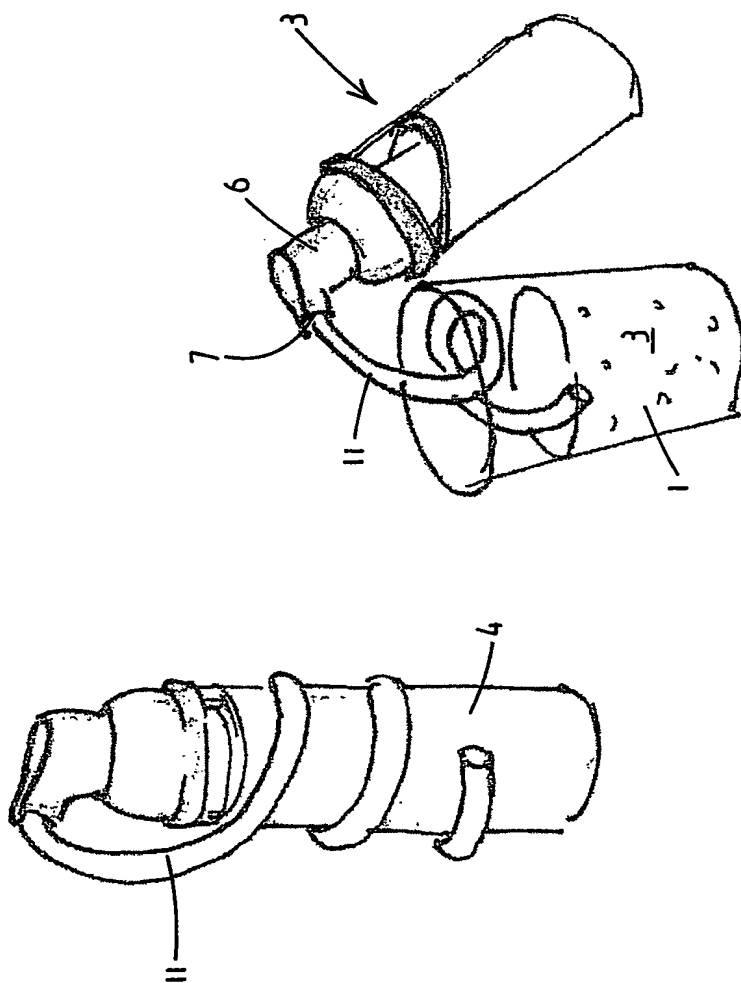


Fig. 3

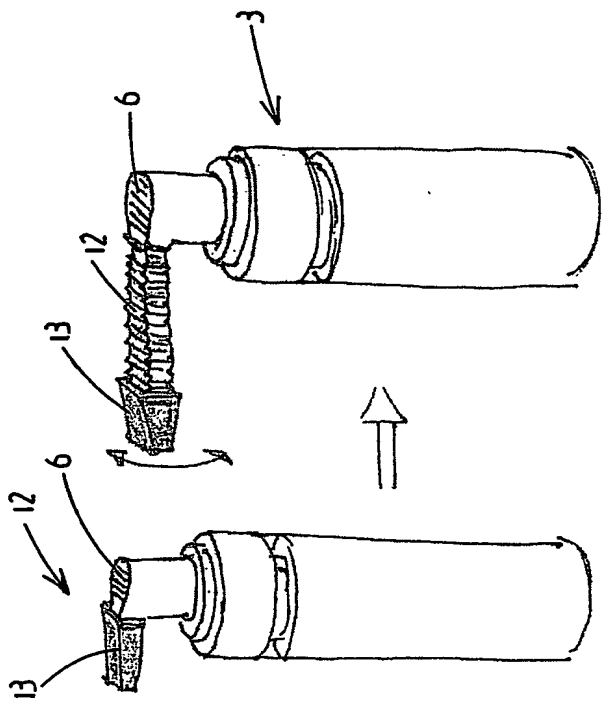


Fig. 4A

Fig. 4B

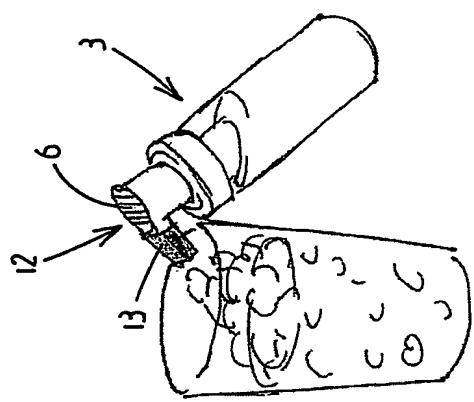


Fig. 4D

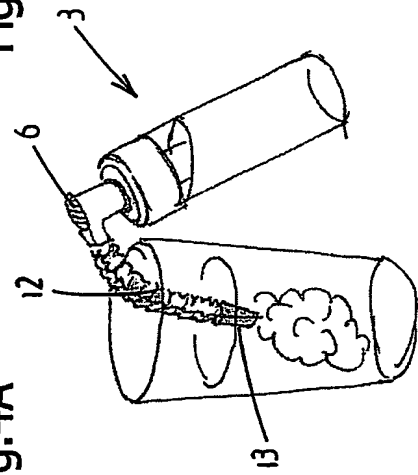


Fig. 4C

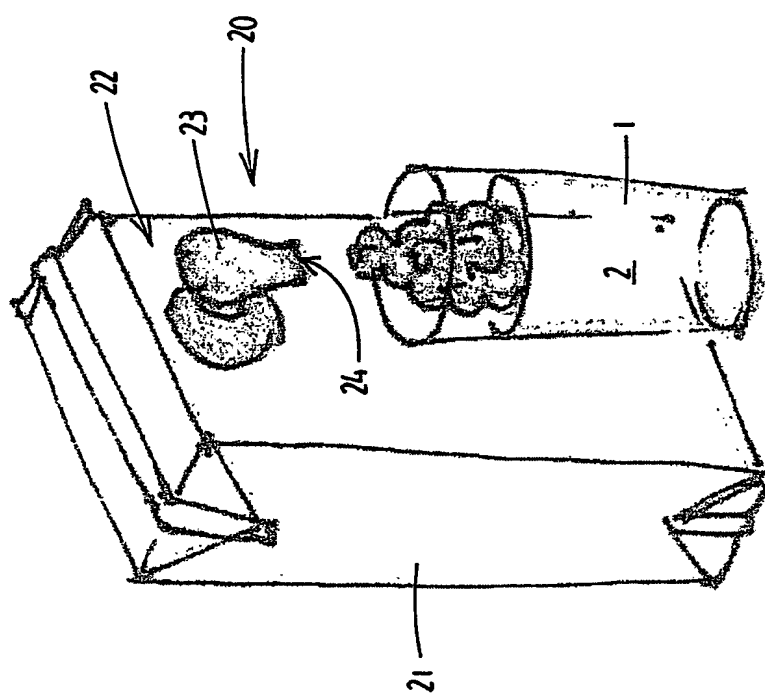


Fig. 5

# INTERNATIONAL SEARCH REPORT

International Classification No  
PCT/NL 03/00707

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B67D1/08 B01F3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B67D B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US RE33564 E (FORD, G.W.) 2 April 1991 (1991-04-02) column 2, line 31 -column 3, line 16; figure 1	15-18, 20,22,24
A	WO 97 33813 A (MENKEN DAIRY FOOD B V ;BOONSTRA MAARTEN PETER NICOLAA (NL); BORST) 18 September 1997 (1997-09-18) page 7, line 8 - line 21; figure 1	1
A	US 2 977 231 A (SIDNEY PALLEY ET AL) 28 March 1961 (1961-03-28) cited in the application the whole document	
A	US 2002/048626 A1 (BROWN WILLIAM ET AL) 25 April 2002 (2002-04-25)	
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the International filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the International filing date but later than the priority date claimed

- \*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the International search

11 February 2004

Date of mailing of the international search report

23/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Müller, C

# INTERNATIONAL SEARCH REPORT

International Publication No.  
PCT/NL 03/00707

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 6 371 332 B1 (FOX ALBERT H) 16 April 2002 (2002-04-16)</p> <p>-----</p>	

# INTERNATIONAL SEARCH REPORT

International Publication No  
PCT/NL 03/00707

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US RE33564	E	02-04-1991	AU 565378 B2 AU 9137282 A CA 1192877 A1 CH 650394 A5 DE 3246284 A1 ES 8400859 A1 FR 2517991 A1 GB 2116636 A IN 158673 A1 JP 1409486 C JP 58128165 A JP 62013060 B MX 158942 A NL 8204812 A , B, SE 447962 B SE 8207071 A US 4531660 A ZA 8209129 A	17-09-1987 23-06-1983 03-09-1985 31-07-1985 14-07-1983 16-02-1984 17-06-1983 28-09-1983 03-01-1987 24-11-1987 30-07-1983 24-03-1987 31-03-1989 01-07-1983 12-01-1987 15-06-1983 30-07-1985 26-10-1983
WO 9733813	A	18-09-1997	NL 1002559 C2 AT 188440 T AU 2236597 A DE 69701084 D1 DE 69701084 T2 EP 0885154 A1 ES 2144309 T3 WO 9733813 A1	09-09-1997 15-01-2000 01-10-1997 10-02-2000 14-09-2000 23-12-1998 01-06-2000 18-09-1997
US 2977231	A	28-03-1961	CH 395884 A DE 1210309 B FR 1256844 A GB 897258 A NL 111578 C NL 251637 A DK 108905 C	15-07-1965 03-02-1966 24-03-1961 23-05-1962  19-02-1968
US 2002048626	A1	25-04-2002	US 6068875 A US 5948461 A US 5766665 A US 6126983 A US 5778761 A US 5653157 A AU 738687 B2 AU 3003797 A CA 2265623 A1 DE 69708154 D1 DE 69708154 T2 EP 0958234 A1 NZ 334534 A WO 9806660 A1	30-05-2000 07-09-1999 16-06-1998 03-10-2000 14-07-1998 05-08-1997 27-09-2001 06-03-1998 19-02-1998 13-12-2001 13-06-2002 24-11-1999 25-08-2000 19-02-1998
US 6371332	B1	16-04-2002	NONE	

# INTERNATIONAL SEARCH REPORT

Rec'd PCT/PTO 18 APR 2005

International Application No  
PCT/NL 03/00707

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B67D1/08 B01F3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B67D B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US RE33564 E (FORD, G.W.) 2 April 1991 (1991-04-02) column 2, line 31 -column 3, line 16; figure 1	15-18, 20, 22, 24
A	WO 97 33813 A (MENKEN DAIRY FOOD B V ;BOONSTRA MAARTEN PETER NICOLAA (NL); BORST) 18 September 1997 (1997-09-18) page 7, line 8 - line 21; figure 1	1
A	US 2 977 231 A (SIDNEY PALLEY ET AL) 28 March 1961 (1961-03-28) cited in the application the whole document	
A	US 2002/048626 A1 (BROWN WILLIAM ET AL) 25 April 2002 (2002-04-25)	

-/--

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

11 February 2004

Date of mailing of the international search report

23/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Müller, C

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/NL 03/00707

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 371 332 B1 (FOX ALBERT H) 16 April 2002 (2002-04-16)	



# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/NL 03/00707

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US RE33564	E	02-04-1991	AU 565378 B2	17-09-1987
			AU 9137282 A	23-06-1983
			CA 1192877 A1	03-09-1985
			CH 650394 A5	31-07-1985
			DE 3246284 A1	14-07-1983
			ES 8400859 A1	16-02-1984
			FR 2517991 A1	17-06-1983
			GB 2116636 A	28-09-1983
			IN 158673 A1	03-01-1987
			JP 1409486 C	24-11-1987
			JP 58128165 A	30-07-1983
			JP 62013060 B	24-03-1987
			MX 158942 A	31-03-1989
			NL 8204812 A ,B,	01-07-1983
			SE 447962 B	12-01-1987
			SE 8207071 A	15-06-1983
			US 4531660 A	30-07-1985
			ZA 8209129 A	26-10-1983
WO 9733813	A	18-09-1997	NL 1002559 C2	09-09-1997
			AT 188440 T	15-01-2000
			AU 2236597 A	01-10-1997
			DE 69701084 D1	10-02-2000
			DE 69701084 T2	14-09-2000
			EP 0885154 A1	23-12-1998
			ES 2144309 T3	01-06-2000
			WO 9733813 A1	18-09-1997
US 2977231	A	28-03-1961	CH 395884 A	15-07-1965
			DE 1210309 B	03-02-1966
			FR 1256844 A	24-03-1961
			GB 897258 A	23-05-1962
			NL 111578 C	
			NL 251637 A	
			DK 108905 C	19-02-1968
US 2002048626	A1	25-04-2002	US 6068875 A	30-05-2000
			US 5948461 A	07-09-1999
			US 5766665 A	16-06-1998
			US 6126983 A	03-10-2000
			US 5778761 A	14-07-1998
			US 5653157 A	05-08-1997
			AU 738687 B2	27-09-2001
			AU 3003797 A	06-03-1998
			CA 2265623 A1	19-02-1998
			DE 69708154 D1	13-12-2001
			DE 69708154 T2	13-06-2002
			EP 0958234 A1	24-11-1999
			NZ 334534 A	25-08-2000
			WO 9806660 A1	19-02-1998
US 6371332	B1	16-04-2002	NONE	